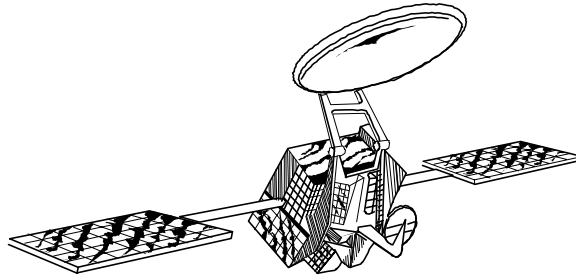


## GLOBAL BROADCAST SERVICE (GBS)



### DoD ACAT ID Program

Total Number of Systems:	493
Total Program Cost (TY\$):	\$458M
Average Unit Cost (TY\$):	\$928K
Full-rate production:	4QFY02

### Prime Contractor

Raytheon Systems

### SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Global Broadcast Service (GBS) will augment and interface with other communications systems and provide a continuous, high-speed, one-way flow of high-volume data, audio, imagery, and video information streams to deployed and garrisoned forces across the globe. GBS will support routine operations, training and military exercises, special activities, crisis response, situational awareness, weapons targeting, and intelligence. GBS will also support the transition to and conduct of operations short of nuclear war. GBS is designed to provide the warfighter with the *information superiority* necessary to act inside the decision cycle of the adversary and execute *precision engagement* as the *dominant maneuver* force during activities leading up to and during armed conflict.

GBS consists of a space segment, fixed and transportable transmit suites, and fixed and transportable receive suites. The space segment of the current phase of GBS consists of three Ultra High Frequency Follow-On (UFO) satellites, each modified with four GBS transponders and an undetermined number of leased commercial satellites. Transmit suites build broadcast data streams from various sources of information, including command, weather and intelligence agencies and commercial television programming such as the Cable News Network. They manage the flow of selected information through the uplink broadcast antenna to the orbiting satellites for broadcast to the appropriate theaters of operation. The receive suites reverse this process and distribute the information to the appropriate end users within selected areas of operation.

### BACKGROUND INFORMATION

The Conduct of the Persian Gulf War-The Final Report to Congress, April 1992, highlights the limited ability of current military and civilian satellite communication systems to provide responsive, high-capacity communications to deployed mobile tactical units. GBS is designed to fulfill that need.

The GBS acquisition strategy was conceived as a three-phase program based on an evolutionary system design supported by commercially available technology. The program is currently in Phase II. GBS Phase I, conducted from FY96-FY98, was used to develop the user requirements and concepts of operations. GBS Phase II, scheduled for completion in FY06, will develop near-worldwide GBS core operational capability and further refine operational requirements and employment concepts. It is expected that most of the hardware design will remain relatively stable throughout Phase II; however, substantial hardware re-design has been necessary to meet military requirements. GBS Phase III, scheduled to begin for FY06 and beyond, is currently undefined.

Milestone II for the GBS Phase II system occurred in November 1997. In June 1999, the GBS Joint Program Office submitted a Program Deviation Report to the Milestone Decision Authority notifying him of a breach in the Acquisition Program Baseline (APB) schedule. The schedule breach is attributed to construction delays at the Sigonella, Italy transmit site, delay of the launch of UFO-10, as well as problems with transmit suite software and transportable/fixed receive suite design. On April 27, the Joint Requirements Oversight Council (JROC) (JROCM 080-00) directed the Air Force to develop an incremental strategy to initially field and test GBS terminals and revise or clarify the ORD with respect to the deferred capabilities that would be incrementally fielded. The JROC approved this incremental strategy on June 27, (JROCM 111-00) and a revised APB was submitted in July 2000.

The system will be incrementally fielded with three successive software builds (2.1, 2.2 and 2.3) during FY01. IOC for this core system is projected for 4QFY01 and Milestone III (previously scheduled for 1QFY00) slipped to 3QFY02. The deferred capabilities of full broadcast history, classified video, and remote enable will be fielded in two additional builds, (2.4 and 2.5) with an IOC for this upgraded capability projected for 4QFY02. Finally, the more lightweight rugged TGRS configuration will be released in FY03, with an IOC for this configuration projected for 4QFY03.

## **TEST & EVALUATION ACTIVITY**

Phase I demonstrated that the core technologies required to execute the GBS program have been developed and that a GBS-like capability has military utility.

The Phase II GBS TEMP is currently being rewritten to reflect the incremental fielding and testing requested by the JROC and recently approved by the MDA. Submission of operational test plans will follow shortly after approval of the TEMP. A Combined Test Force was formed to coordinate the planning of all GBS system testing. Members of the Combined Test Force include representatives from the using commands, the program office, the development contractors, and the Army, Navy, Air Force, and Marine Corps OTAs. The OTAs participated in developmental testing as members of the Combined Test Force and have provided feedback to the development community. Developmental test events have included factory acceptance tests, site acceptance tests, Y2K tests, shipboard receive suite tests, and on-orbit tests of UFO satellites 8, 9, and 10.

UFO satellite 8, the first UFO satellite equipped with a GBS payload, was successfully launched from Cape Canaveral Air Station on March 16, 1998. The satellite was declared ready to support GBS transmit and receive suite testing in the Pacific region in June 1998. The combined DT/OT, which was to begin at that time, was postponed because of software development and security-related issues impacting the fixed transmit suite in Hawaii and fixed receive suites in Korea. These tests were conducted from October 1998-January 1999 after the Program Office evaluated and accepted the contractor's fixes, revised master schedule and development approach. However, testing revealed

numerous performance, quality, reliability and durability problems with both the fixed and transportable ground receive suites. Both have undergone a complete re-design since that time.

The original plan was to deliver and test the ground software in three increments of increasing maturity. There will now be an incremental DT/OT phase in conjunction with each hardware and software release. MOT&E will test the configuration of Build 2.3, which should contain the core capability approved by the JROC. Although MOT&E will use Build 2.3, DOT&E has requested that Builds 2.4 and 2.5 be tested in accordance with its “Guidelines for Conducting Operational Test and Evaluation for Software-Intensive System Increments,” and that these results reported to DOT&E for inclusion in the B-LRIP report. The purpose is to mitigate risk by demonstrating that Builds 2.4 and 2.5 achieve desired capabilities and require no hardware modifications before the Milestone III full-rate production authority is granted. Finally, there will be an FOT&E following release of the lightweight rugged TGRS.

## **TEST & EVALUATION ASSESSMENT**

The software and hardware problems have been significant. The strategy of having transmit and receive suites in place for test and within the footprint of each of the three UFO/GBS satellites in time to start system testing immediately after satellite checkout has only been marginally executable due to various schedule slips. The tests are being performed, but the satellites will be on-orbit for many months before system testing begins. As GBS equipment delivery dates and locations change, the test program (including detailed test plans) must be regularly updated to keep pace with the changes.

The GBS program continues to encounter and resolve many technical and operational issues. DOT&E views the following issues as the most challenging in the months before MOT&E:

- *Tracking contractor delivery of Build 2.1.* The proposed incremental fielding and test schedule will only be achievable if there truly has been a shift in the caliber of contractor performance, which will be demonstrated by an on-time delivery of a Build 2.1 system before the end of 1QFY01.
- *Providing necessary broadcasts during the split fielding of Build 2.1 in the Atlantic and Build 2.2 in the Pacific.* This creates certain conflicts for the Navy, which will require Build 2.2 broadcasts on both coasts during its installation phase. The potential use of the transportable Theater Injection Point for the Atlantic broadcast creates separate scheduling problems for the Army.
- *Coordinating schedule slips with the Navy installation schedule.* Navy participation is essential to successful MOT&E. However, installation of shipboard terminals requires careful coordination between hardware availability dates and dates of scheduled maintenance.
- *Finalizing concepts of operations and agreement among competing Theater Commander in Chiefs' (CINCs).* Finalizing concepts of operations and agreements among CINCs' regarding the appropriate use of GBS and sharing of satellite broadcast resources to support conflicting regional needs in time of crisis may be a challenge.

## **RECOMMENDATIONS**

DOT&E supports the incremental fielding and testing as approved in the current APB. This assumes that MOT&E is a capstone event that includes all major system components and demonstrates full core system functionality and interoperability. Test results for software builds 2.4 and 2.5 must be presented to DOT&E prior to Milestone III to mitigate risk by demonstrating that no hardware design changes will be required to support these builds.

The GBS Program Office should:

- Monitor contractor delivery of software builds and be prepared to restructure the success-driven test schedule if the contractor does not demonstrate his ability to deliver a fully functional final product.
- Continue to work aggressively with the Information Dissemination Management office to ensure that the appropriate architectures are in place to support a successful MOT&E and terminal fielding.
- Continue to work with the operational user community to finalize the concepts of operation, which define how the GBS system will be used in the field.

The Combined Test Force should:

- Complete the rewrite of the TEMP and expedite the signature coordination process.
- Complete individual and combined Service operational test plans associated with MOT&E. Provide plans and associated briefings to DOT&E as soon as possible.
- Track training to assure that there will be sufficiently trained operators at the necessary skill levels to operate all necessary receive and broadcast suites.